accorded to the Lorraine steel works by Germany in the matter of coke supplies, since the Germans have failed to carry out their obligations under the terms of the Peace Treaty, and have delivered only about one-third of the tonnage promised, notwithstanding the fact that there are large stores of furnace coke in Westphalia. Since Great Britain has been short of basic pig iron for a long time, and there is every prospect of the shortage continuing, some such reciprocal arrangement as that put forward might be of advantage to both countries.

The Commission states that there is no doubt that economy in fuel consumption is very fully effected, owing to the absence of cheap and suitable fuel and the dependence of the works upon Westphalian coke. All the waste heat is utilised at every works. The blast-furnace gas is suitably cleaned and fully absorbed. The works at Homécourt may be cited as an instance. Before the war they were producing 9000 tons of pig iron and 7000 tons of steel weekly, and they used only 280 tons of coal, all the remaining power being produced from blast-furnace gas. This is quite typical. The molten metal is taken from the blast furnaces to the mixers in the adjacent steel works and the sensible heat thus utilised.

A study of the report leaves the impression that the development of the iron- and steel-producing areas in Lorraine which have passed from German to French management presents problems which will call for patient consideration, dispassionate counsel, and scientific treatment, if they are to be surmounted successfully. The formidable position which Germany had built up between 1871 and 1914 has been lost to her by the war. It remains to be seen what France will make of the heritage which has passed into her hands.

Obituary.

WE regret to note that the death of MR. JOHN W. W. DRYSDALE is recorded in the *Engineer* for June 25 as having occurred on June 21. Mr. Drysdale was in his seventy-second year, and was one of the founders of the well-known Glasgow firm of Drysdale and Co., Ltd. He finished his education at Glasgow University under Prof. Macquorn Rankine, and thereafter started a small works in conjunction with a fellow-student, Mr. Lewis J. Pirrie, son of Principal Pirrie of Aberdeen. Centrifugal pumps formed their outstanding speciality from the first, and the firm has acquired a wide reputation for its products. Mr. Drysdale was a member of the Institution of Engineers and Shipbuilders in Scotland.

WE announce with great regret the death, at the Queen Alexandra Military Hospital, Millbank, of SURGEON-GENERAL W. C. GORGAS, of the U.S. Army, so well known for his work in combating yellow fever and malaria.

Notes.

THE Lord President of the Council, as president of the Committee of Council for Scientific and Industrial Research, has appointed Dr. J. S. Flett, at present Assistant to the Director in Scotland, to be Director of the Geological Survey and Museum. Dr. Flett succeeds Sir Aubrey Strahan, who retires this month. Mr. G. W. Lamplugh, Assistant to the Director in England, also retires.

SIR JOHN CADMAN, Mr. W. B. Hardy, and Prof. S. Young have been appointed by an Order in Council members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

IT is announced that Sir T. Clifford Allbutt is to be sworn a member of the Privy Council.

THE secretaryship of the Royal Irish Academy, vacant through the death of Prof J. A. McClelland, has been filled by the election of Prof. G. H. Carpenter.

THE Barnard medal of Columbia University has been awarded to Prof. Einstein "in recognition of his highly original and fruitful development of the fundamental concepts of physics through the application of mathematics."

DR. E. SOLVAY has been elected an honorary member of the American Chemical Society.

THE Medical Research Council has recently established at the Lister Institute of Preventive Medicine a national collection of type cultures from which biologists in general, and bacteriologists in particular, may obtain authentic strains of recognised bacteria and protozoa for use in scientific work. The scheme is under the general direction of Dr. J. C. G. Ledingham, while Dr. R. St. John Brooks has been appointed to the post of curator of the collection and Miss Mabel Rhodes to that of assistant curator. It is proposed to collect and maintain bacterial strains from all departments of bacteriology, human, veterinary, and economic, and already considerable work has been done towards the formation of a representative collection on these lines. The efforts of the staff are, however, at present particularly directed towards the securing of fully authenticated strains responsible for or associated with disease in man and animals. The bureau proposes to supply cultures on demand to all workers at home and abroad, and, as a rule, a nominal charge per culture will be made to defray postage and media. Strains sent for identification and maintenance should be accompanied by particulars as to source, date of isolation, etc. In due course a catalogue will be prepared for publication.

IN NATURE of January 1 last an account was given of the Cawthron Institute of New Zealand, founded for the furtherance of scientific research in relation to agriculture and other industries. The scope of the institute has since been extended by the establishment of a biological department, of which Dr. R. J. Tillyard, the eminent Australian entomologist, hitherto research fellow of Sydney University, has been appointed chief. He will be assisted by Miss K. M. Curtis as mycologist and Mr. A. Philpott as assistant entomologist. We understand that members of the scientific staff of the institute will have full freedom as to research and publication.

A COMMITTEE, composed of the following members, has been appointed by the Ministry of Health to consider and report on the legislative and administrative measures necessary to secure adequate protection for the health of the people in connection with the slaughter of animals and the distribution of meat for human consumption in England and Wales:—Sir H. C. Monro (chairman), Mr. W. G. R. Boys, Mr. R. B. Cross, Mr. J. Edwards, Dr. W. J. Howarth, Dr. A. W. J. MacFadden, Mr. T. Masheter, Mr. A. W. Monro, Mr. T. Parker, Mr. R. J. Robinson, and Mr. P. Taylor. Mr. H. F. O. Jerram is the secretary of the Committee, and communications should be addressed to him at the Ministry of Health, Whitehall, S.W.1.

IT was stated by Mr. Bonar Law in the House of Commons on Monday last, with reference to the question of scientific war inventions, that the Lord President of the Council is about to appoint an inter-Departmental Committee with the following terms of reference:—(1) To consider the methods of dealing with inventions made by workers aided or maintained from public funds, whether such workers be engaged (*a*) as research workers or (*b*) in some other technical capacity, so as to give a fair reward to the inventor and thus encourage further effort, to secure the utilisation in industry of suitable inventions, and to protect the national interest; and (2) to outline a course of procedure in respect of inventions arising out of State-aided or supported work, which shall further these aims and be suitable for adoption by all Government Departments concerned.

A SPECIAL meeting of the Röntgen Society is to be held at University College, Gower Street, at 9 o'clock on Thursday evening, July 15, when an address will be delivered by Dr. W. D. Coolidge, of the Research Laboratories of the General Electric Co., Schenectady, New York. An invitation to the meeting is given to the members of other scientific and medical societies.

A FREE public lecture on "Oil Storage, Transport, and Distribution" is to be delivered by Mr. H. Barringer at 6 o'clock on July 14 in the Canada Building, Crystal Palace, under the auspices of the Institution of Petroleum Technologists. The institution has also arranged for the delivery of four lectures, as follow, in September, the actual dates for which will be announced later: "Oil Prospecting," Mr. G. Howell; "Petroleum Refining," Dr. A. E. Dunstan; "Utilisation of Volatile Oils," Dr. W. R. Ormanby, and "Utilisation of Heavy Oils," Prof. J. S. S. Brame.

THE annual Oxford Ophthalmological Congress will take place in the Department of Human Anatomy in the University Museum, Oxford, on July 15 and 16. Among the promised communications are the following: The Doyne memorial lecture, by F. R. Cross, on "The Nerve Paths and Centres concerned with Sight": A. S. Percival, "Light Sense"; Dr. Van der Hœve, "Eye Symptoms in Tuberose Sclerosis of the Brain"; Dr. L. C. Peter and others, "Perimetric Methods"; M. Barton, "Examination of the Eyes of Pit Ponies, particularly with reference to Miners' Nystagmus"; A. H. Thompson, "Physiological and Glaucoma Cups"; R. D. Batten, "Premonitory Symptoms of Glaucoma"; and Dr. L. Sambon, "Ancient Eye Instruments."

THE Research Association for the Silk Industry has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The secretary of the committee engaged in the establishment of this association is Mr. A. B. Ball, the Silk Association of Great Britain and Ireland, Kingsway House, Kingsway, W.C.2.

THE jubilee of the American Fisheries Society will be celebrated at Ottawa on September 20–22 next. In connection with the meeting prizes will be offered for papers on the following subjects: Advance in practical fish cultural work; biological work connected with fish problems in general; and the solution of problems affecting commercial fisheries work. The competitive essays should be received by, at latest, August 20. Further information can be obtained from the executive secretary, Prof. R. C. Osburn, Ohio State University, Columbus, Ohio.

A PROPOSAL is on foot by the Swedish Linnean Society to restore the old botanic garden at Upsala, together with the house in it, the former residence of Carl von Linné, and subscriptions towards this object are solicited. Particulars of the suggested memorial can be obtained from the General Secretary of the Linnean Society of London, Burlington House, W.1, and donations sent to him or direct to the Swedish Linnean Society at Upsala.

ARCHITECTS, timber merchants, firms engaged in the building and furniture trades, railway companies, and, in fact, all users and consumers of wood, paper, and other forest products, should visit the British Empire Timber Exhibition, which is open to the public at the Holland Park Skating Rink, London, until July 17. The exhibition has been organised to display the forest wealth of the British Empire. Before the war the greater part of the immense importations of timber into the United Kingdom, some 10,000,000 tons annually, came from foreign countries, and many of these were closed during the war. This necessitated a considerable development of the sources of supply within the Empire and a greater demand on our home forests. The main object of the exhibition is a patriotic one, namely, to show that our timber requirements can be met in great measure from our Dominions and Colonies, thus extending Imperial trade. The specimens of timber include very many beautiful, valuable, and useful woods, of which only a few may be mentioned as examples, such as rosewood, satinwood, mahogany and its various substitutes, teak, greenheart, jarrah, ironwood, and the numerous cedar woods. There is also a complete set of exhibits demonstrating the various uses to which timbers are put, as floors, panelling, veneers, plywood, furniture, and articles of everyday use. Many decorative exhibits are of great interest. The preparation of paper-pulp from bamboos is also shown. An exhaustive catalogue of the exhibits has been prepared. This gives both the botanical and trade names, the countries of origin, and names of shippers and importers. Each wood is fully described as regards its general characteristics, tension strength, and other useful data. The information in the catalogue has been compiled by the various Forest Departments of the Empire, and has a scientific as well as a commercial value.

THE half-yearly report of the Department of Civil Aviation on the progress of civil aviation from October, 1919, to March, 1920, contains many features of general interest. A very detailed survey of the results which have been achieved is given with regard to activities both in the British Empire and in foreign countries. Tabulated figures concerning the operation of air services between England and the Continent show that a slow but definite progress has been made. The importance of the International Air Convention is emphasised, and it is satisfactory to note that this Convention has now been signed by all the Allied Powers. The record of activities in foreign countries shows that many attempts are being made to develop commercial flying for both inland and international trade. France and Italy show the most promising results, and both are making efforts to exploit the possibilities of commercial aviation in Asia and South America. In late enemy countries many aviation companies have been formed to develop commercial flying, but no actual results have yet been achieved owing to the economic conditions prevailing. The first paragraph of the conclusion of the report is worthy of quotation as an apt summary of the present position. The Controller-General says:—"The discovery of a new method of increasing the speed of inter-communication has in the past generally indicated a fresh step in the march of civilisation. In aviation a means of transport has been obtained twice as fast as any other previously existing. The majority of countries which are imbued with the spirit of progress appear to realise that the future of aviation cannot be neglected, and by various methods, such as the creation of aviation departments, research, subsidies, and the conduct of experimental services, are striving to adapt aviation to commerce." Progress may be somewhat slow under the unsettled conditions which now prevail throughout the world, but there is little doubt that as the general economic situation improves, so will the advance of civil aviation become more rapid.

IN 1910 Dr. W. Max Müller was enabled, through the liberality of the Carnegie Institution of Washington, to visit the doomed island of Philæ, and to glean the epigraphic material left by the Berlin expedition His immediate purpose was the decipherment of the famous bilingual inscriptions engraved on the walls of the large court between the first and the second pylons. This was exceedingly difficult, as the small, shallow-engraved signs become distinctly visible only during the short time of the day when they receive strong light. The Carnegie Institution has now published in a suitable style the result of Dr. Max Müller's labours. He gives complete facsimiles, transliterations, and translations of the inscriptions, and a learned introduction adequately reviews the historical information thus collected. The work is in every way creditable to the learned explorer and the Carnegie Institution.

IN the University of California Publications in American Archæology and Ethnology (vol. xvi., No. 6) Miss Lucile Hooper gives a valuable account of Shamanism among the Cahuilla Indians, one of the largest surviving tribes in Southern California. At one of their *fiestas* or annual rites the Shaman first took a dark substance from his breast; then "he reached into the fire with his foot and kicked out a few coals. One of these he picked up; it was about the size of a dollar He immediately put it into his mouth. I was only a few feet away, and one of the sparks from his mouth, as he blew, fell on my hand, so I can testify that they were hot. The glow from the coal could be seen on the roof of his mouth. He swallowed it in about a minute. He swallowed three coals in this way." The dancing and singing are part of the rite. One man intended to eat the coals, "but his song had not gone right; he had forgotten part of it, no doubt due to some disturbing influence among those watching, or perhaps because of some spirit preventing his success. Since his song did not go right, he could do nothing." Other marvels of a similar kind are reported. "Another man saw a dove walking around; he raised his hands and clapped them together. The dove dropped as though dead, and blood flowed from its mouth. He then picked it up, threw it into the air, and it flew off as though nothing had happened." The report includes a full account of the religious and domestic rites practised by the tribe. Their pottery, which was of an interesting type, has now disappeared with the use of manufactured articles.

AN interesting report by Mr. R. S. White, on an outbreak of pellagra amongst Armenian refugees at Port Said during 1916–17 has been published (Reports and Notes of the Public Health Laboratories, Cairo, No. 2, 1919). Much controversy has occurred with regard to the nature of this disease. In the outbreak in question the weight of evidence points entirely to a faulty diet as the causal factor, and the disease was eradicated from the camp by correcting this, all other conditions remaining the same. The diet at the time had an energy-value of about 2000 Calories only, which is very low, the protein amounting to but 46–48 grams, of which some 90 per cent was derived from vegetable sources and was of low biological value. Maize had no direct causal relation to the disease. No protozoan or bacterial cause was discovered, nor could any connection with biting insects be found. The results of the inquiry are in accordance with the findings of Goldberger in the United States.

Mr. Francis Harper, the assistant biologist of the United States Biological Survey, contributes to *Natural History*, the journal of the American Museum of Natural History, vol. xx., No. 1, an article of remarkable interest on the Okefinokee Swamp, which covers nearly seven hundred square miles of the south-eastern part of the State of Georgia. "It has no counterpart anywhere in the world." Drainage and the "lumber-man" threaten its existence, and unless the hand of the destroyer can be stayed it is certain that a considerable number of vanishing birds and beasts will be swept out of existence, this swamp being their last stronghold. In 1918 a society was formed for the purpose of securing the swamp as an educational and scientific reservation, and it is devoutly to be hoped that this aim will be secured; for such areas are of immense value, not only to the people of America, but also to the world of science at large.

We have received from the American Museum of Natural History a brief preliminary report on the zoological collections made under its direction in the Belgian Congo territory during the years 1909–15. Of mammals, birds, and fishes respectively there are about 6000 specimens, of reptiles and batrachians nearly 5000, and of invertebrates more than 100,000. Material has been obtained for mounted groups of the okapi and square-lipped rhinoceros in their natural surroundings. There are also 3800 specimens illustrating anthropology. It is anticipated that the scientific papers on the collection will occupy twelve volumes of the Museum Bulletin, and a monograph of the okapi is being prepared for the Memoirs. There will also be a Narrative in two volumes and an Ethnological Album in three volumes. In consideration of the generous co-operation of the Belgian Government, a selection of duplicate specimens will be sent to the Congo Museum at Tervueren.

The Crocker Land Expedition to North-West Greenland and Grinnell Land covered a district but little visited previously by naturalists. The mollusca obtained on the expedition by Dr. M. C. Tanquary and Mr. W. E. Ekblaw have now been described by Mr. F. C. Baker (Bull. Amer. Mus. Nat. Hist., vol. xli., 1919, pp. 479–517, pls. 25–27). No new species are claimed, but the number determined exceeds by four those obtained on the Nares Expedition of 1875–76, when thirty-four were enumerated by the late Mr. E. A. Smith. The more important species of Astarte and Buccinum have been figured, with the detailed sculpturing of the shells of the latter, but the chief interest in the collection is the number of species found in high latitudes and the extension of the northward range of several of the species. The same author (*tom. cit.*, pp. 527–39, figs.) also describes a number of fresh-water mollusca obtained by Prof. Frank Smith from various lakes in Colorado and Alberta. Fifteen species in all are dealt with, of which three are believed to be new.

A preliminary account of the Tasmanian skeleton of Nototherium, to which we referred in last week's issue (p. 559), was read before the Royal Society of Tasmania on May 10 by Messrs. H. H. Scott and C. Lord. The authors assign the specimen to *N. Mitchelli*, and consider that it was originally provided with a horn on the nose. They regard the Nototheria as the marsupial analogues of the rhinoceroses, some of them horned, others hornless.

The atmosphere that surrounds the *Revue des questions scientifiques*, which is published at Louvain for the Société scientifique de Bruxelles, permits of the most liberal agnosticism in regard to scientific dogmas. Prof. Pierre Termier, in his address on "Les grands énigmes de la Géologie," delivered in the welcome epoch of recovery at Louvain in 1919 (*Revue*, vol. xxvii., p. 53, 1920), responds with his accustomed vigour to the invitation of his northern colleagues. His splendid oratory rings through these pages, in which he brings us face to face with the sphinxes that rise in the domain of geological inquiry and raise in the soul of the traveller "des pensées vertigineuses et des rêves sans fin." In his desire to show how much remains truly enigmatic, he makes no mention of tentative or even probable explanations, and his hesitating spirit before the evidences of organic evolution seems the pose of the courteous guest rather than the free expression of the prophet. For Prof. Termier, in his mere use of language, is a prophet and a power, and he hopes yet to see some secrets wrested from the earth as part of the general movement of humanity towards light and truth. On p. 149 of the same number of the *Revue* M. P. Teilhard de Chardin, who was present with the late Mr. Dawson at Piltdown, gives an excellent account of the human remains that have excited so much controversy, and he assures his readers that when palæontologists come to an agreement it is because they believe loyally and invincibly that their judgment has been based on truth. It is evident that these things still need saying, even in *sociétés scientifiques*, though we may have advanced some way from the scene so bitterly depicted by Barabino in his "Colombo deriso" at the Council of Salamanca.

The New York Academy of Sciences has published two more parts of the results of its scientific survey of Porto Rico and the Virgin Islands (vol. i., part 2, and vol. iii., part 1). Porto Rico is largely and essentially a heap of volcanic *débris*, and Mr. Edwin T. Hodge attempts to unravel its geological history after making a detailed study and map of the Coamo-Guayama district. He also adds some useful notes on its mineral resources and hot springs. The limestones inter-stratified with the volcanic tuffs contain numerous fossil shells, which are, unfortunately, preserved only as impressions, but clearly represent several horizons between the Eocene and Miocene Tertiary. The shells are described in detail, with beautiful illustrations, by Miss Carlotta J. Maury, who makes some interesting remarks on their relation to the molluscs of existing seas. She points out that most of them are represented by living species which are evidently their descendants in the Antillean seas, but that several of the Tertiary genera have now completely disappeared from the Caribbean region, and exist only in the Pacific Ocean. The latter must have spread before the Isthmus of Panama arose, and it is difficult to understand why they survived only on the western side of this barrier of land.

THE *Meteorological Magazine* for June deals with the recent disastrous flood at Louth as completely as possible at the time of going to press, and adds somewhat to the account in NATURE of June 10 (p. 468). The characteristic features are given of the hot weather experienced over England during the last week of May, which occasioned the development of numerous thunderstorms. A disturbance, centred over the Bristol Channel on the morning of May 29, traversed the Midlands during the day. Little or no rain fell on May 29 south of a line passing through Plymouth, Reading, and Lowestoft, and none was observed over the centre and west of Scotland. There was more than an inch of rain over the greater part of Lancashire, the West Riding of Yorkshire, Lincolnshire, and the east of Nottinghamshire. In Lincolnshire the rainfall was very severe. At Louth the fall was only 1·42 in., but at Elkington Hall, three miles to the west, the fall was 4·69 in., and of this 4·59 in. fell in three hours. At Hallington, about two miles south, 4·10 in. fell in two hours, when the gauge overflowed and the exact total fall was lost. Ten miles further south, at Horncastle, 3·95 in. fell in three hours. The magazine states that, according to the Borough Surveyor, the Lud stream, normally 3 ft. wide and 1 ft. deep, was swollen to a width of 52 yards and a depth of 50 ft. It appears that the stream was temporarily blocked with *débris*, and the flood was the result of the sudden breaking down of this obstacle. The periodical has a very suggestive and useful article on the ventilation of instrument shelters by the Director of Armagh Observatory. The general rainfall for May in England and Wales was 117 per cent. of the average, in Scotland 164 per cent., and in Ireland 145 per cent.

THE report of the Imperial Wireless Telegraph Committee (Cmd. 777, price 6*d.* net) contains an interesting review of the capabilities of different systems of wireless transmission for long-distance working, and forms a striking vindication of the powers of the thermionic valve, which it is proposed to employ as the sole means of generating the waves required for the chain of stations 2000 miles apart which are recommended. We admire the courage of the Committee in putting forward a system which, in its own words, "departs widely from the general direction of contemporary practice." It admits that "the objects desired might perhaps be secured by other and more conventional methods, but by none, in our opinion, not involving an immediate capital expenditure and a heavy annual loss which the scientific progress of a few years might well prove to have been unnecessary." Discussing the alternative systems, the Committee dismisses even the latest developments of the spark system as obsolete. The high-frequency alternator system it characterises as "costly, difficult to repair, and as yet insufficiently tested in prolonged operation." The arc system is described as "pre-eminent at the present moment among methods of long-range wireless transmission." Arcs of greater power than 250 kw., however, present elements of uncertainty, and apparently do not deliver to the aerial a greater effective current than those rated at lower powers. Although the valve system cannot show the same degree of accomplished results as any of the preceding, the Committee has evidence of such rapid advances now being made that it recommends its adoption without hesitation. It has already been found that a group of three glass valves delivering 2½ kw. into the aerial can effect communication over two thousand miles. Silica valves are now designed by means of which, with suitable grouping, 120 kw. will, it is hoped, be delivered into the aerial. Owing to the greater purity of wave-form of valve-generated over arc-generated waves, this arrangement should be considerably more effective than a 250-kw. arc, which does not really deliver more than 120 kw. into the aerial. There are several other advantages for valve working claimed in the report which we have not the space to mention here.

THE deposition of iron by electrolysis is a method which has lately been employed to a considerable extent for the purpose of "building up" worn and under-gauge parts of both aeroplanes and guns. The work, however, has not been done under proper scientific control, and not infrequently defects have manifested themselves in use in the iron thus deposited. A paper dealing with some of these was presented by Mr. W. E. Hughes at the recent meeting of the Iron and Steel Institute. In his capacity as chief research chemist to the Electrometallurgical Committee of the Ministry of Munitions, Mr. Hughes had opportunities of making extended observations upon the structure of the electro-deposited metal. He found that it was liable to contain pinholes, lumps, inclusions of foreign matter, cracks, and "quasi-cracks," and that a given specimen might present very marked differences of structure. He concludes that these defects may render the iron dangerous and unsuitable for engineering purposes, but that they arise from causes which can be largely eliminated by efficient control of the deposition process. It is generally assumed that electrolytic iron is a very pure product, but, as he shows, this is by no means necessarily the case. Further, it is usually assumed to be hard, and may indeed be so, though not always. Whether the hardness, when it occurs, is due to included hydrogen is a question which has not yet been settled. Mr. Hughes's investigation has proceeded sufficiently far for him to entertain decided doubts about this explanation.

MESSRS. DULAU AND CO., LTD., 34 Margaret Street, W.1, have just issued an important catalogue (No. 83) of secondhand books of science in the departments of ornithology, entomology, general zoology, geology and palæontology, geography, travel, and topography, botany and horticulture. Of the 1256 works listed many are out of print and not easily obtainable. The catalogue can be had free upon request.

ANOTHER of the useful catalogues (No. 403) of Mr. F. Edwards, 83 High Street, Marylebone, W.1, has reached us. It consists of descriptions of some seven hundred works relating to Central and South America, and should be of interest to many readers of NATURE.